WHAT IS CLAIMED IS:

1. A flat plate heat transfer device, comprising:

a thermally conductive flat case installed between a heat source and a heat emitting unit, and containing a working fluid that is evaporated with absorbing heat from the heat source and condensed with emitting heat to the heat emitting unit; and

a mesh layer aggregate installed in the flat case and having a structure that fine mesh layer and coarse mesh layer are laminated with being opposite to each other,

wherein the coarse mesh layer is a screen mesh with a wire diameter from 0.20 mm to 0.40 mm and a mesh number from 10 to 20.

2. The flat plate heat transfer device according to claim 1, further comprising another fine mesh layer which is opposite to the fine mesh layer with the coarse mesh layer interposed therebetween and which is contacted with the coarse mesh layer.

3. The flat plate heat transfer device according to claim 1 or 2,

wherein the fine mesh layer is a screen mesh woven by mesh wires with a diameter from 0.03 mm to 0.13 mm or having a mesh number from 80 to 400.

4. The flat plate heat transfer device according to claim 1 or 2,

wherein the coarse mesh layer is made of metal material.

5. A flat plate heat transfer device, comprising:

a thermally conductive flat case installed between a heat source and a heat emitting unit, and containing a working fluid that is evaporated with absorbing heat from

the heat source and condensed with emitting heat to the heat emitting unit; and

a mesh layer aggregate installed in the flat case and having a structure that fine mesh layer and coarse mesh layer are laminated with being opposite to each other,

wherein the coarse mesh wire is a screen mesh made of metal material and having a wire diameter from 0.20 mm to 0.40 mm and a mesh number from 10 to 20, and provides a flowing path of liquid in horizontal and vertical directions by means of capillary force and a dispersion path of vapor.

6. A flat plate heat transfer device, comprising:

a thermally conductive flat case installed between a heat source and a heat emitting unit, and containing a working fluid that is evaporated with absorbing heat from the heat source and condensed with emitting heat to the heat emitting unit; and

a mesh layer aggregate installed in the flat case and having a structure that wick structure and coarse mesh layer are laminated with being opposite to each other,

wherein the coarse mesh layer is a screen mesh with a wire diameter from 0.20 mm to 0.40 mm and a mesh number from 10 to 20.

7. The flat plate heat transfer device according to claim 6, further comprising another wick structure which is opposite to the wick structure with the coarse mesh wire interposed therebetween and which is contacted with the coarse mesh layer.

8. The flat plate heat transfer device according to claim 6 or 7,

wherein the wick structure is made by sintering copper, stainless steel, aluminum or nickel powder.

9. The flat plate heat transfer device according to claim 6 or 7,

wherein the wick structure is made by etching polymer, silicon, silica (SiO_2), copper, stainless steel, nickel or aluminum plate.

10. The flat plate heat transfer device according to claim 6 or 7,

wherein the coarse mesh layer is made of metal material.

11. A flat plate heat transfer device, comprising:

a thermally conductive flat case installed between a heat source and a heat emitting unit, and containing a working fluid that is evaporated with absorbing heat from the heat source and condensed with emitting heat to the heat emitting unit; and

a mesh layer aggregate installed in the flat case and having a structure that wick structure and coarse mesh layer are laminated with being opposite to each other,

wherein the coarse mesh wire is a screen mesh made of metal material with a wire diameter from 0.20 mm to 0.40 mm and a mesh number from 10 to 20, and provides a flowing path of liquid in horizontal and vertical directions by means of capillary force and a dispersion path of vapor.

12. A flat plate heat transfer device, comprising:

a thermally conductive flat case installed between a heat source and a heat emitting unit, and containing a working fluid that is evaporated with absorbing heat from the heat source and condensed with emitting heat to the heat emitting unit; and

a mesh layer aggregate installed in the flat case and having a structure that fine mesh layers and coarse mesh layers are alternately laminated repeatedly.

13. The flat plate heat transfer device according to claim 12,

wherein the coarse mesh layer is a screen mesh woven by mesh wires with a diameter from 0.2 to 0.4 mm and having a mesh number from 10 to 20.

14. The flat plate heat transfer device according to claim 12,

wherein the fine mesh layer is a screen mesh woven by mesh wires with a diameter from 0.03 to 0.13 mm or having a mesh number from 80 to 400.

15. The flat plate heat transfer device according to claim 12,

wherein the fine mesh layers and the coarse mesh layers are alternately laminated to be contacted with each other.

16. The flat plate heat transfer device according to claim 12,

wherein the mesh layer aggregate has a structure that is laminated in the order of fine mesh layer, coarse mesh layer, fine mesh layer, coarse mesh layer and fine mesh layer, from bottom to top.

17. The flat plate heat transfer device according to claim 12,

wherein the mesh layer aggregate has a structure that is laminated in the order of fine mesh layer, coarse mesh layer, fine mesh layer and coarse mesh layer, from bottom to top.

18. The flat plate heat transfer device according to claim 12,

wherein the mesh layer aggregate has a structure that is laminated in the order of at least two fine mesh layers, coarse mesh layer, fine mesh layer and coarse mesh layer,

from bottom to top.

19. The flat plate heat transfer device according to claim 12,

wherein the mesh layer aggregate has a structure that is laminated in the order of at least two fine mash layers, coarse mesh layer, fine mesh layer, coarse mesh layer and at least two fine mesh layers, from bottom to top.

20. The flat plate heat transfer device according to claim 12,

wherein the fine mesh layer provides a flowing path of liquid.

21. The flat plate heat transfer device according to claim 12,

wherein the coarse mesh layer provides a flowing path of liquid and a dispersion path of vapor at the same time.

22. The flat plate heat transfer device according to any of claims 1 to12,

wherein the flat case is made of electrolytic copper foil, and

wherein a uneven surface of the electrolytic copper foil configures an inner surface of the flat case.

23. The flat plate heat transfer device according to claim 12,

wherein the coarse mesh layers and the fine mesh layers are woven by mesh wires made of metal, polymer, plastic or glass fiber.

24. The flat plate heat transfer device according to any of claims 1 to 23,

wherein the flat case is made of metal, conductive polymer, metal coated with

conductive polymer, or conductive plastic.

25. The flat plate heat transfer device according to claim 24,

wherein the metal is copper, aluminum, stainless steel, molybdenum, or their alloys.

26. The flat plate heat transfer device according to any of claims 1 to 23,

wherein the flat case is sealed using a manner selected from the group consisting of laser welding, plasma welding, TIG (Tungsten Inert Gas) welding, ultrasonic welding, brazing, soldering, and thermo-compression lamination.

27. The flat plate heat transfer device according to any of claims 1 to 23,

wherein the working fluid is selected from the group consisting of water, methanol, ethanol, acetone, ammonia, CFC working fluid, HCFC working fluid, HFC working fluid, and their mixtures.

28. A flat late heat transfer device, comprising:

a thermally conductive flat case installed between a heat source and a heat emitting unit and containing a working fluid that is evaporated with absorbing heat from the heat source and condensed with emitting heat to the heat emitting unit; and

a mesh layer aggregate installed in the flat case and having a structure that a wick structure for providing a flowing path of liquid by means of capillary force and a coarse mesh layer for providing a flowing path of liquid by means of capillary force and a dispersion path of vapor at the same time are alternately laminated repeatedly with being contacted with each other.

29. The flat plate heat transfer device according to claim 28,

wherein the wick structure is made by sintering copper, stainless steel, aluminum or nickel powder.

30. The flat plate heat transfer device according to claim 28,

wherein the wick structure is made by etching polymer, silicon, silica (SiO_2), copper, stainless steel, nickel or aluminum plate.

31. The flat plate heat transfer device according to claim 28,

wherein the wick structure or the coarse mesh layer is no less than 2-layer structure.